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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/646,073 | 08/22/2003 | David R. Shafer | KLAC0076 | 8450 |

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| EXAMINER | |
|---|---|
| FINEMAN, LEE A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2872 | |

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/646,073 | SHAFER ET AL. | |
| | Examiner | Art Unit | |
| | Lee Fineman | 2872 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *43-99* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *43-99* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/22/03 & 10/21/05* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

This Office Action is in response to an amendment filed 21 October 2005 in which claims 43, 49, 55, 61, 65, 78 and 90 were amended. Claims 43-99 are pending.

### *Drawings*

1. Drawings were received on 21 October 2005. These drawings are acceptable.

### *Claim Objections*

2. Claim 49 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Independent claim 43 states "an objective constructed of a single glass material," but claim 49, which depends from claim 43, requires two glass materials. It is not clear how a single material can also be two materials.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 65-74 and 76-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al., US 2001/0040722 A1 in view of Yonekubo, US 4,108,794 or Suwa, US 5,825,043.

Regarding claims 65, 69, 73-74, 76 and 77, Shafer et al. disclose a method of inspecting a specimen (see fig. 3) comprising: providing light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range (page 6, section [0082]); focusing said light energy using at least one lens (308) into focused light energy, where each lens used in said focusing has diameter less than approximately 100 millimeters (fig. 3); receiving said focused light energy and converting said focuses light energy into intermediate light energy (with 304 or 307); receiving said intermediate light energy through an optical element (306, as shown in fig. 3, the light is clearly passing through the Mangin mirror optical element before being reflected back to another optical element) and providing controlled light energy to a specimen (309, not shown); wherein providing, focusing, focused light energy receiving, and intermediate light energy receiving is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations (page 7, sections [0083]-[0085]); wherein providing, focusing, focused light energy receiving, and intermediate light energy receiving is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced (page 6, section [0081]); and wherein each lens used has a diameter of less than approximately 25 millimeters (fig. 3). Shafer et al. disclose the claimed invention except for the controlled light energy going through an immersion substance to the specimen. Immersion substances, including water and oil are well known in the microscope/lithography art to obtain better imaging performance. For example, Yonekubo or Suwa teach using an immersion substance, including water and oil, to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33). Therefore it would have been

obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer et al. to provide better imaging performance.

Regarding claim 72, Shafer et al. also disclose in fig. 9 a method of inspecting a specimen with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range with focusing, focused light energy receiving, and intermediate light energy receiving and focusing lenses less than approximately 100 millimeters (fig. 9) wherein only two glass materials are used (see table 5) comprising fused silica and calcium fluoride (see table 5). Shafer et al. disclose the claimed invention except for the controlled light energy going through an immersion substance to the specimen. Immersion substances, including water and oil are well known in the microscope/lithography art to obtain better imaging performance. For example, Yonekubo or Suwa teach using an immersion substance, including water and oil, to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer et al. to provide better imaging performance.

Regarding claims 66-68, Shafer et al. in view of Yonekubo or Suwa as set forth above disclose the claimed invention except for wherein said objective has a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make objective have a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the objective have a field size of

approximately 0.15 mm and a numerical aperture of approximately 1.2 for the purpose of providing a larger field of view. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 70-71, Shafer et al. further disclose said objective having a long working distance used with a microscope (figs. 1 and 2) having a flange (at 102 or 202) but is silent as to the location of the flange being approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the flange be approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the flange be approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation for the purpose of having an appropriate working area for interacting with/changing the specimen. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

5. Claim 75 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Yonekubo or Suwa as applied to claim 66 above and further in view Deutsch et al., WO 01/57563 A2.

Shafer et al. in view of Yonekubo or Suwa as applied to claim 66 above disclose the claimed invention except for the immersion substance being a silicone gel. Deutsch et al. teaches using a silicone gel as an immersion substance (page 2, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the immersion substance be a silicone gel as suggested by Deutsch et al. to provide more controllable flow characteristics to the immersion substance.

6. Claims 43-49, 50-51, 53-64, 78-86 and 88-99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Yonekubo or Suwa and Allen et al., US 6,785,051 B2.

Regarding claims 43, 46, 50-51, 53-55, 57, 59, 63, 78, 81, 85-86, 88-90, 92, 94 and 98, Shafer et al. disclose an objective (fig. 3) constructed of a single glass material (page 6, section [0082]) for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range (page 6, section [0082]), comprising: at least one focusing lens (308) having diameter less than approximately 100 millimeters (fig. 3) receiving said light energy and transmitting focused light energy; at least one field lens (304 or 307) having diameter less than approximately 100 millimeters (fig. 3), receiving said focused light energy and transmitting intermediate light energy; and at least one Mangin mirror element (306), which is an optical element, having diameter less than 100 millimeters (fig. 3) receiving said intermediate light energy and providing controlled light energy to a specimen (309, not shown); wherein the objective is optimized to produce minimum spherical aberration, axial color, and chromatic variation of aberrations (page 7, sections [0083]-[0085]); wherein the at least one

Mangin mirror element is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced by the focusing lens group (page 6, section [0081]); wherein each lens used in the objective has a diameter of less than approximately 25 millimeters (fig. 3); wherein said objective is configured to provide broadband imaging while receiving light energy at wavelengths less than 400 nm (see at least the abstract); and wherein said at least one Mangin mirror element (306) comprises a single lens/mirror element comprising substantially curved concave surface (top surface in figure); and a second minimally curved surface (bottom surface in figure). Shafer et al. disclose the claimed invention except for the controlled light energy going through an immersion substance to the specimen; said Mangin mirror element receiving said intermediate light energy through a back/rear side thereof; and wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass. Immersion substances, including water and oil are well known in the microscope/lithography art to obtain better imaging performance. For example, Yonekubo or Suwa teach using an immersion substance, including water and oil, to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer et al. to provide better imaging performance. Further, Allen et al. teach an objective (fig. 2) with at least one Mangin mirror element comprises a single lens/mirror element (60) comprising substantially curved concave surface (fig. 2); and a second minimally curved surface (fig. 2) wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass (column 7, lines 22-34). It would have been obvious to one of ordinary skill in

the art at the time the invention was made to make the Mangin mirror of Shafer et al. in view of Yonekubo or Suwa a double-reflecting one with central apertures as suggested by Allen et al. to be able to make a more compact objective configuration. Therefore the Mangin mirror element will receive said intermediate light energy through a back/rear side thereof.

Regarding claims 49, 61-62, 84 and 96-97, Shafer et al. also disclose in fig. 9 an objective for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range with field and focusing lenses and a Mangin mirror element less than approximately 100 millimeters (fig. 9) wherein only two glass materials are used (see table 5) comprising fused silica and calcium fluoride (see table 5). Shafer et al. disclose the claimed invention except for the controlled light energy going through an immersion substance to the specimen; and said Mangin mirror element receiving said intermediate light energy through a back/rear side thereof. Immersion substances, including water and oil are well known in the microscope/lithography art to obtain better imaging performance. For example, Yonekubo or Suwa teach using an immersion substance, including water and oil, to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a well known immersion substance with the objective of Shafer et al. to provide better imaging performance. Further, Allen et al. teach an objective (fig. 2) with at least one Mangin mirror element including small central apertures through which light energy may pass (column 7, lines 22-34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the Mangin mirror of Shafer et al. in view of Yonekubo or Suwa a double-reflecting one with central apertures as suggested by Allen et al. to be able to make a

more compact objective configuration. Therefore the Mangin mirror element will receive said intermediate light energy through a back/rear side thereof.

Regarding claims 58 and 93, Shafer et al. further disclose said objective (fig. 3) having a numerical aperture of greater than approximately 1.0 at the specimen (page 7, section [0085]).

Regarding claims 44-45, 56, 64, 79-80, 91 and 99, Shafer et al. in view of Yonekubo or Suwa and Allen as set forth above disclose the claimed invention except for wherein said objective has a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make objective have a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the objective have a field size of approximately 0.15 mm and a numerical aperture of approximately 1.2 for the purpose of providing a larger field of view. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 47-48, 60, 82-83 and 95, Shafer et al. in view of Yonekubo or Suwa and Allen as set forth above further disclose said objective having a long working distance used with a microscope (Shafer, figs. 1 and 2) having a flange (at 102 or 202) but is silent as to the location of the flange being approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the flange be approximately 45 millimeters from the specimen during normal

operation or at least approximately 100 millimeters from the specimen during normal operation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. One would have been motivated to have the flange be approximately 45 millimeters from the specimen during normal operation or at least approximately 100 millimeters from the specimen during normal operation for the purpose of having an appropriate working area for interacting with/changing the specimen. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. Claims 52 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer et al. in view of Yonekubo or Suwa and Allen as applied to claims 43 and 78 above and further in view Deutsch et al., WO 01/57563 A2.

Shafer et al. in view of Yonekubo or Suwa and Allen as applied to claims 43 and 78 above disclose the claimed invention except for the immersion substance being a silicone gel. Deutsch et al. teaches using a silicone gel as an immersion substance (page 2, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the immersion substance be a silicone gel as suggested by Deutsch et al. to provide more controllable flow characteristics to the immersion substance.

***Response to Arguments***

8. Applicant's arguments with respect to claims 43-64 and 78-99 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments filed 21 October 2005 have been fully considered but they are not persuasive.

Applicant argues on page 17, paragraph 3 of the remarks that Shafer 722 does not disclose a design wherein the Mangin mirror element has light energy passing therethrough. The examiner respectfully disagrees. As shown in fig. 3, the light is clearly passing through the Mangin mirror optical element before being reflected back to another optical element.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both Yonekubo and Suwa teach using an immersion substance, including water and oil, in microscope and lithography systems to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33).

In response to applicant's argument that extensive redesign of the components and undue amounts of experimentation would be required (see page 18 of remarks), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Again, both Yonekubo and Suwa clearly teach using an immersion

substance in microscope and lithography systems to obtain better imaging performance (see Yonekubo, columns 1-2 and Suwa, column 3, lines 24-33).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

10. It is noted by the Examiner that the drawing objections and double patenting rejections made in the previous Office Action have been withdrawn due to amendment by the Applicant.

However, regarding the arguments to overcome the double patenting rejection, the examiner would first like to point out that the cross-readability test is applicable to Statutory double patenting under 35 USC 101 and not obviousness-type double patenting which has been applied in the rejection. See MPEP § 804. Further, regarding the argument that claims from application 10/434374, which were basically identical to claims of the instant application except for the addition of an immersion liquid, would require extensive redesign of the components and undue amounts of experimentation "if such a design would work at all" (see remarks, page 16, paragraph 3), the examiner then questions whether the instant claims adequately define the invention to one of ordinary skill.

*Conclusion*

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lee Fineman whose telephone number is (571) 272-2313. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LAF
January 11, 2006

MARK A. ROBINSON
PRIMARY EXAMINER